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(54) **SLIDER FOR SLIDE FASTENER**

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(58) **Field of Classification Search**
CPC A44B 19/26; A44B 19/262
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,899,529	A	2/1933	Rutherford	
1,953,726	A	4/1934	Rutherford	
2,838,969	A *	6/1958	Simmons, Sr.	B21D 53/54 227/39
2,855,652	A *	10/1958	Jones	A44B 19/265 24/426
4,048,699	A *	9/1977	Kanzaka	A44B 19/26 24/421
5,007,144	A *	4/1991	Terada	A44B 19/26 24/415

(Continued)

FOREIGN PATENT DOCUMENTS

CN	102860637 A	1/2013
JP	128007/1978	10/1978
WO	2014/073111 A1	5/2014

OTHER PUBLICATIONS

International Preliminary Report on Patentability, PCT International Patent Application No. PCT/JP2014/074949, dated Mar. 30, 2017.

(Continued)

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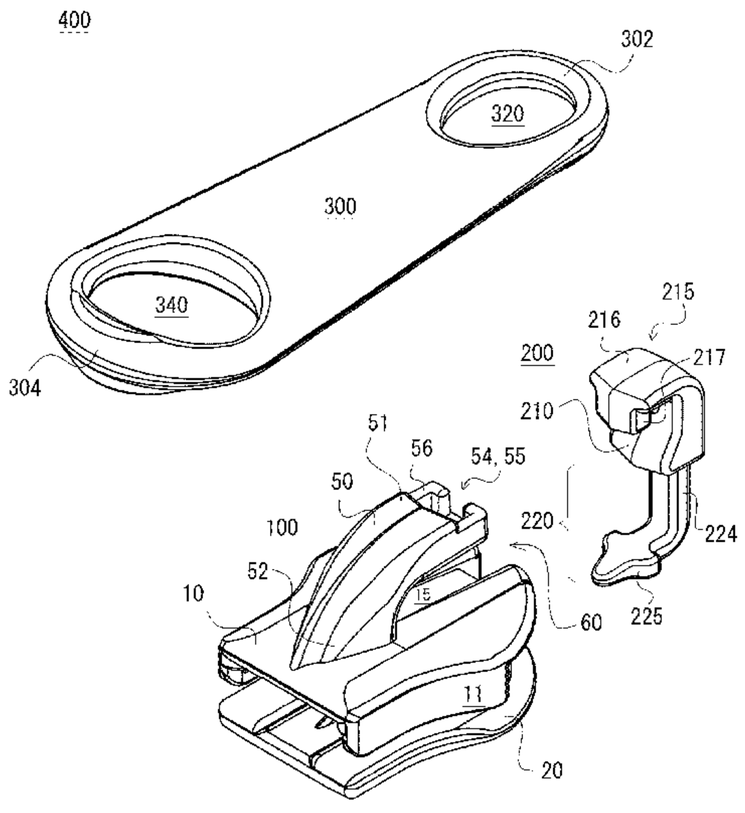
(57) **ABSTRACT**

A slider for slide fasteners may include a slider body and a closure part. The closure part may include a closure portion for closing the gap between a free end portion of a pull tab attachment post and an upper blade; an upper engaging portion provided above the closure portion and engageable with the free end portion of the pull tab attachment post and a leg portion provided below the closure portion. The leg portion may include a rod portion extending from the closure portion along the coupling post and a lower engaging portion coupled to the rod portion and engageable with a lower blade.

10 Claims, 10 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

5,086,546	A *	2/1992	Aoki	A44B 19/26 24/429
5,400,481	A *	3/1995	Oda	A44B 19/26 24/424
5,551,129	A *	9/1996	Chu	A44B 19/26 24/419
5,625,928	A *	5/1997	Terada	A44B 19/308 24/421
6,094,786	A *	8/2000	Wakabayashi	A44B 19/26 24/419
6,701,584	B2 *	3/2004	Metzger	A44B 19/265 24/415
8,122,573	B2 *	2/2012	Takazawa	A44B 19/308 24/418
9,456,663	B1 *	10/2016	Wheeler	A44B 19/301
9,763,498	B2 *	9/2017	Kojima	A44B 19/262
9,968,166	B2 *	5/2018	Inukai	A44B 19/26
2013/0025092	A1 *	1/2013	Ozawa	A44B 19/26 24/429
2014/0082895	A1 *	3/2014	Gold	A44B 19/26 24/415
2015/0335107	A1 *	11/2015	Hamada	A44B 19/26 24/429
2015/0351501	A1 *	12/2015	Zana	A44B 19/26 24/429
2016/0135552	A1 *	5/2016	Li	A44B 19/308 24/424
2017/0224061	A1 *	8/2017	Yamagishi	A44B 19/30
2017/0290394	A1 *	10/2017	Hamada	A44B 19/262

OTHER PUBLICATIONS

International Search Report, PCT International Patent Application No. PCT/JP2014/074949, dated Dec. 16, 2014.

* cited by examiner

Fig. 1

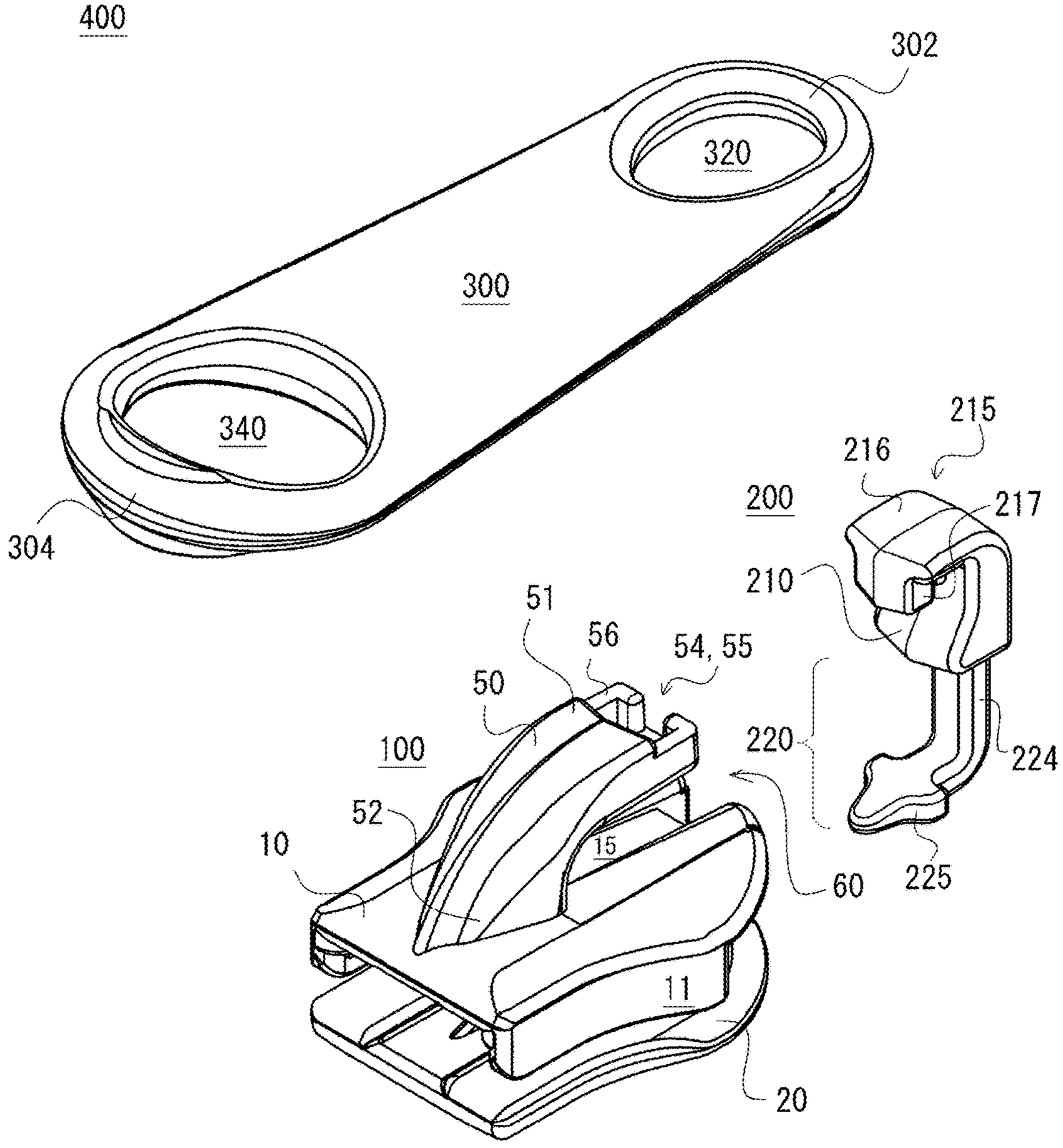

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Fig. 2

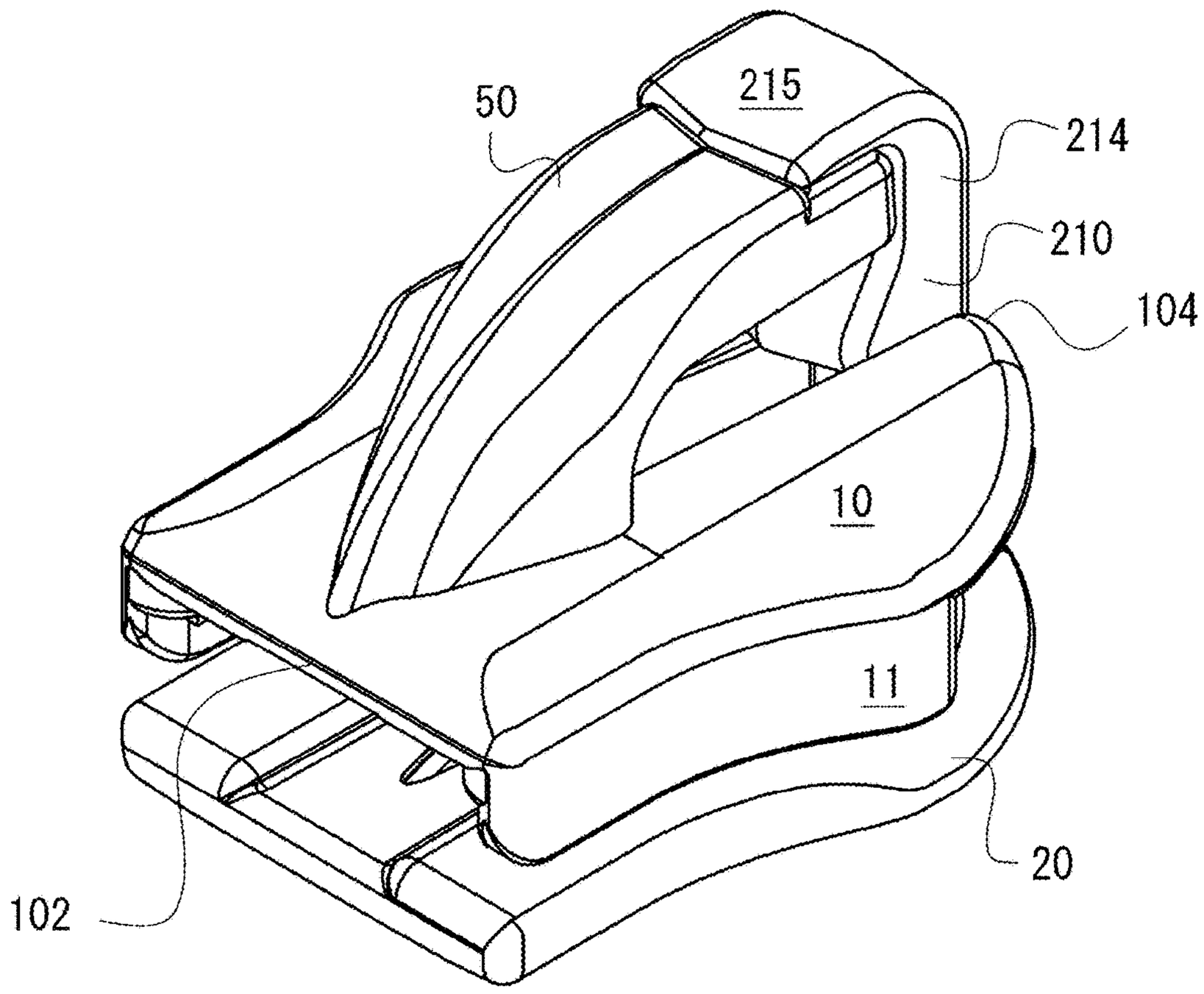

Fig. 3

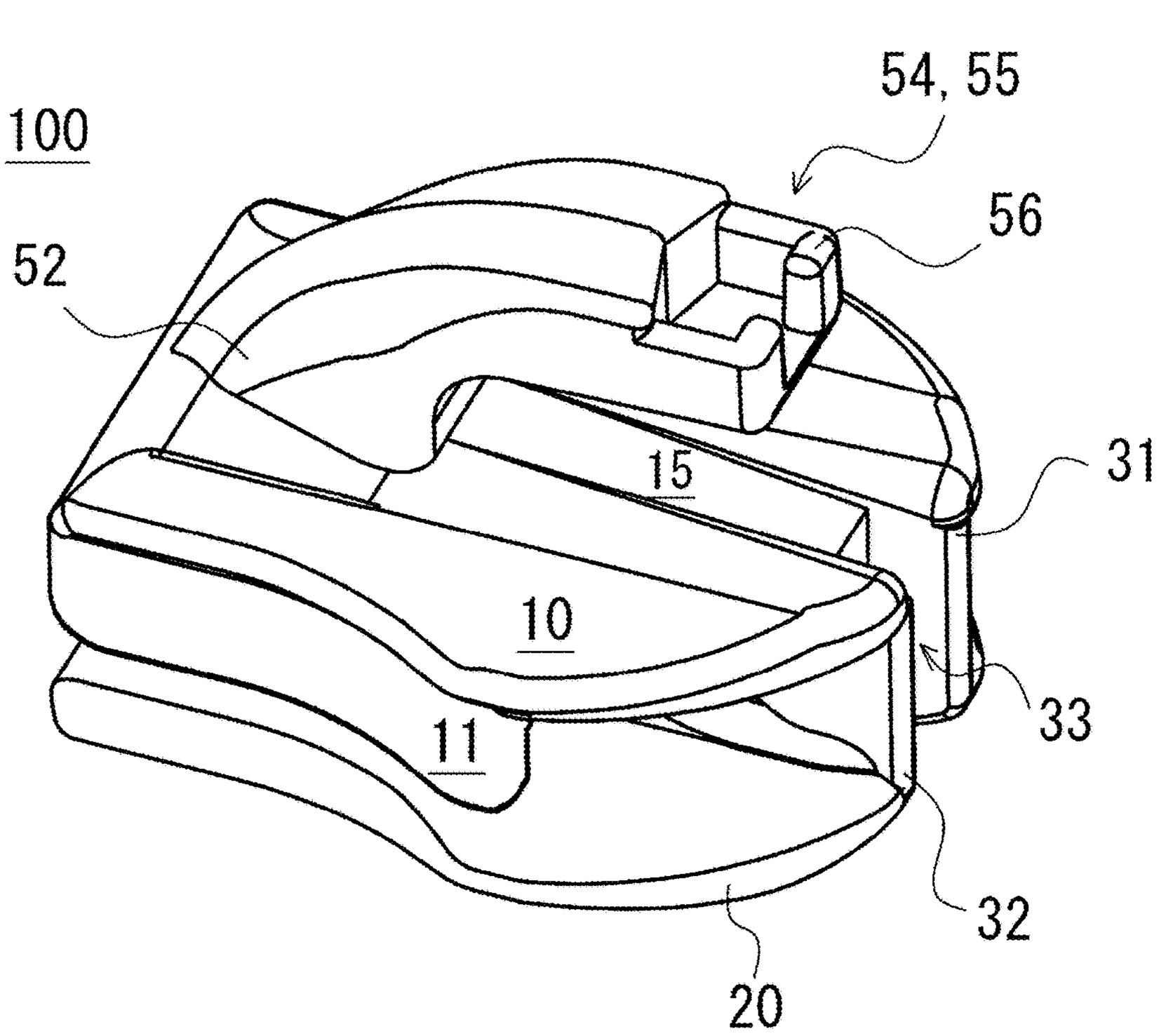

Fig. 4

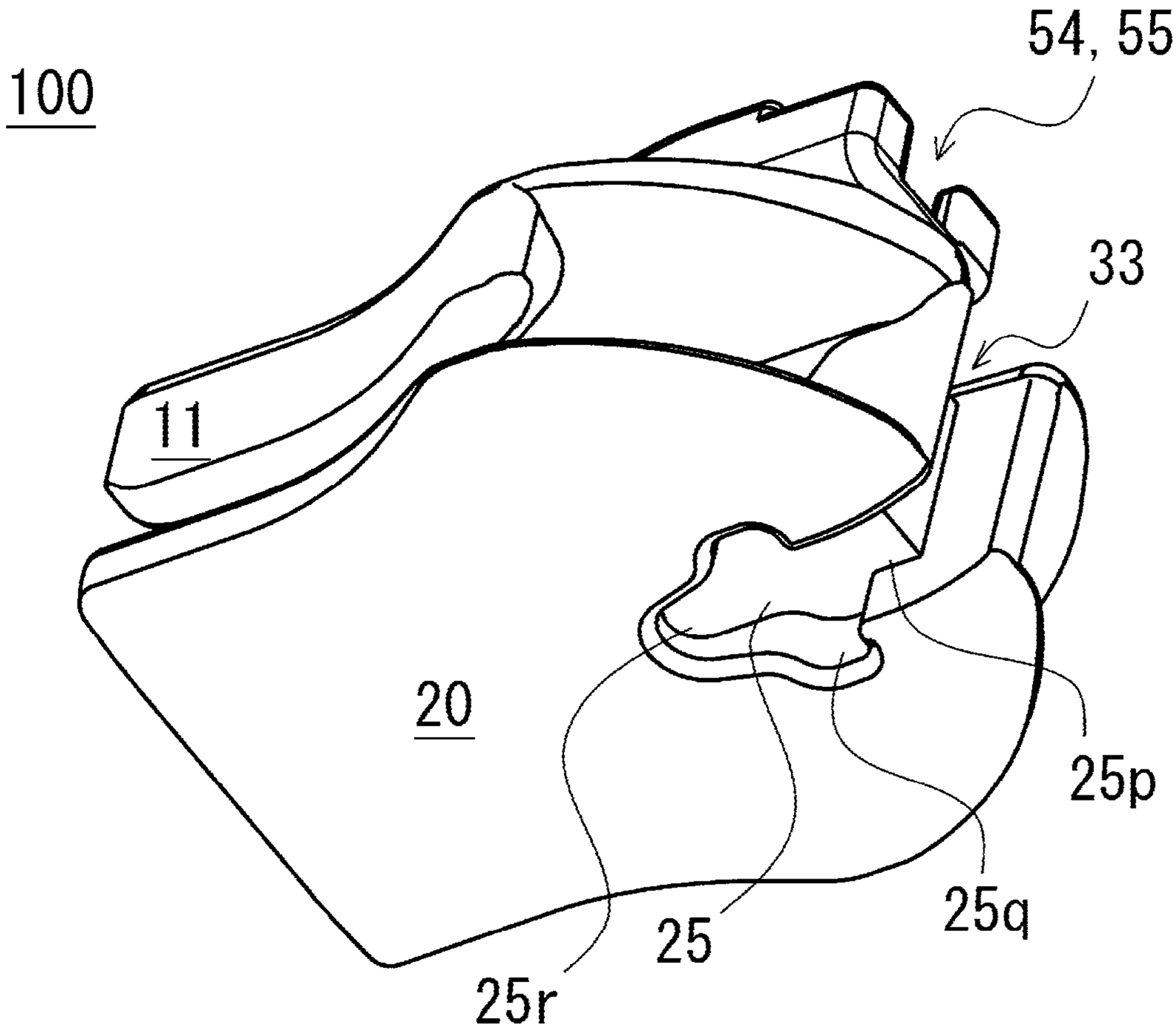

Fig. 5

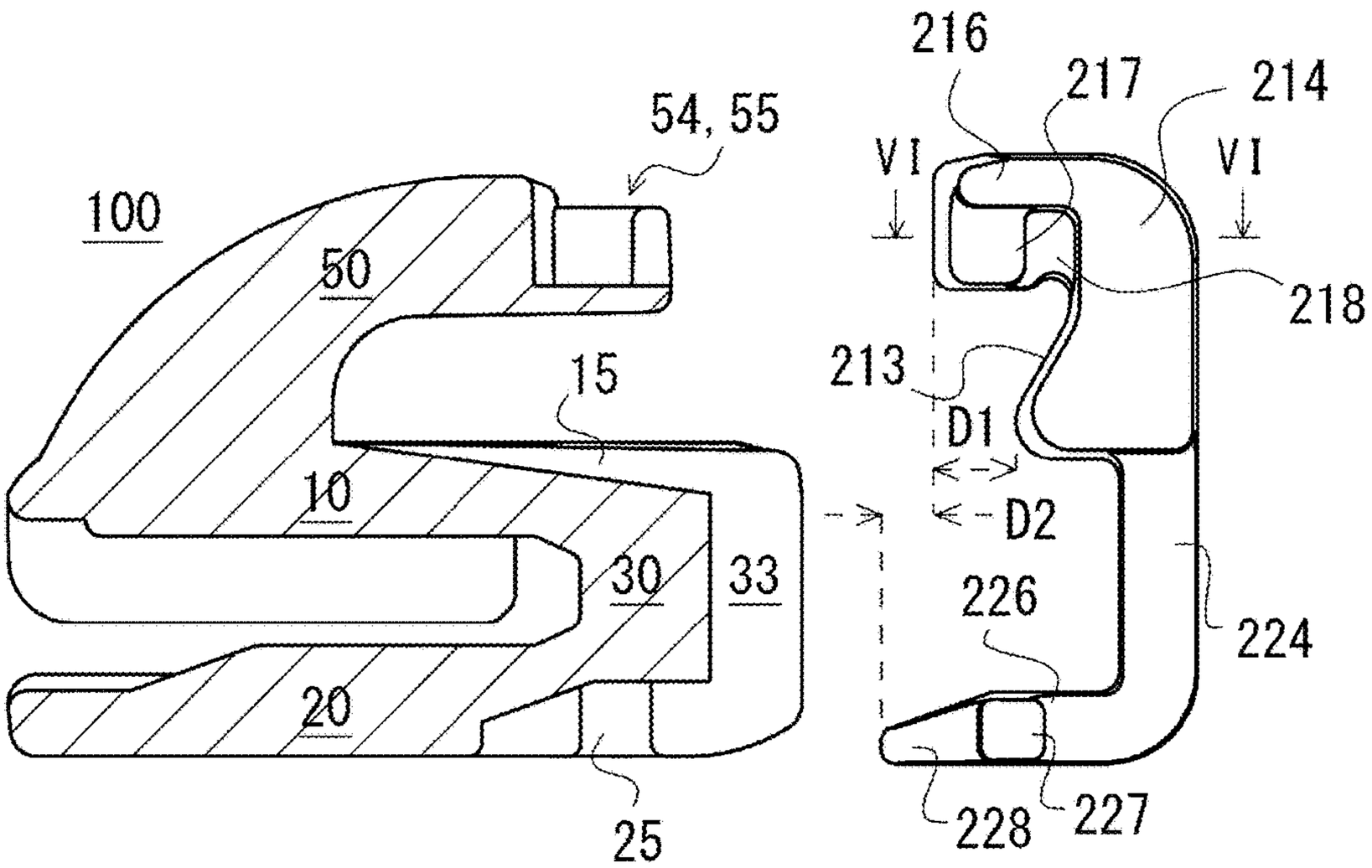
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Fig. 6

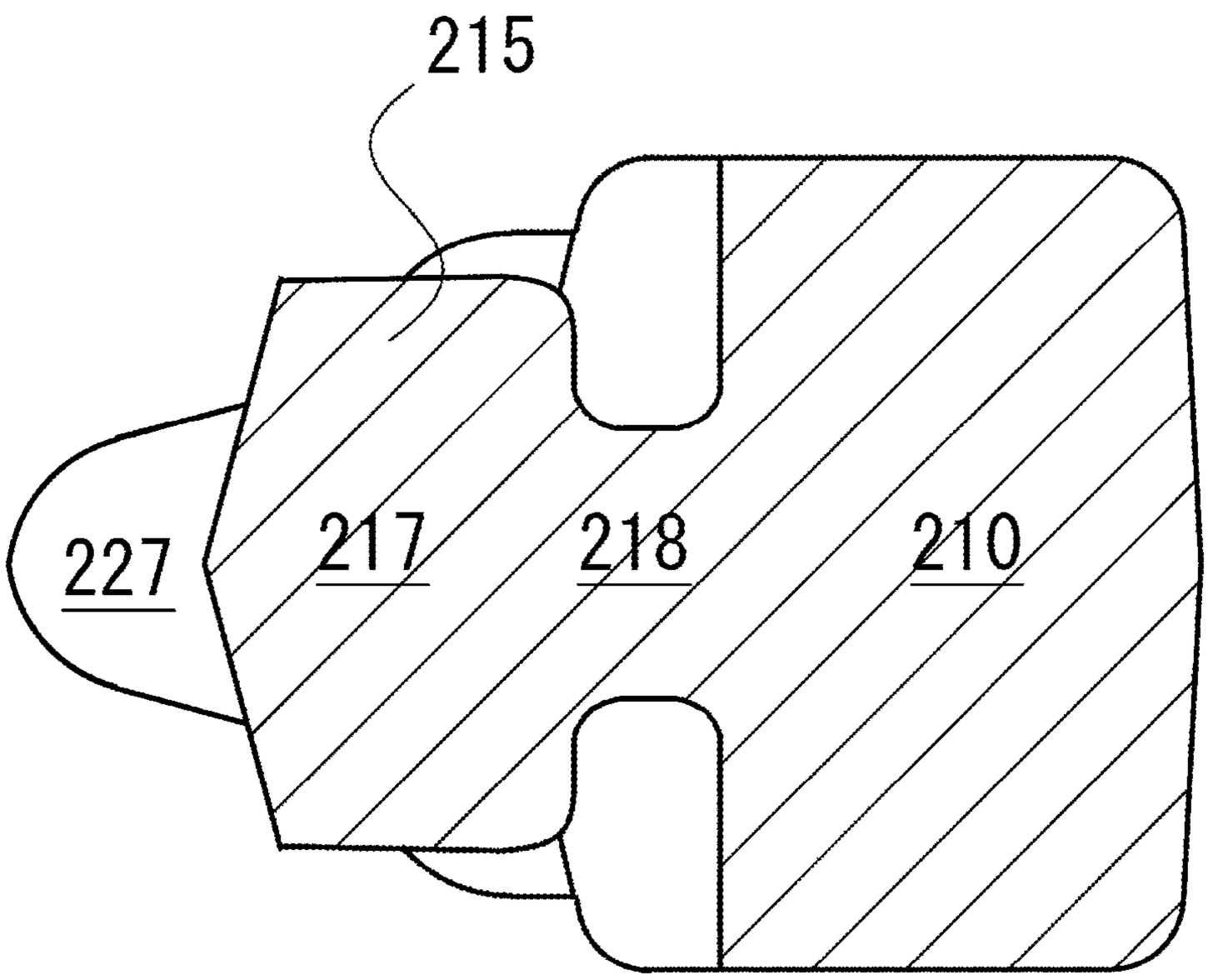


Fig. 7

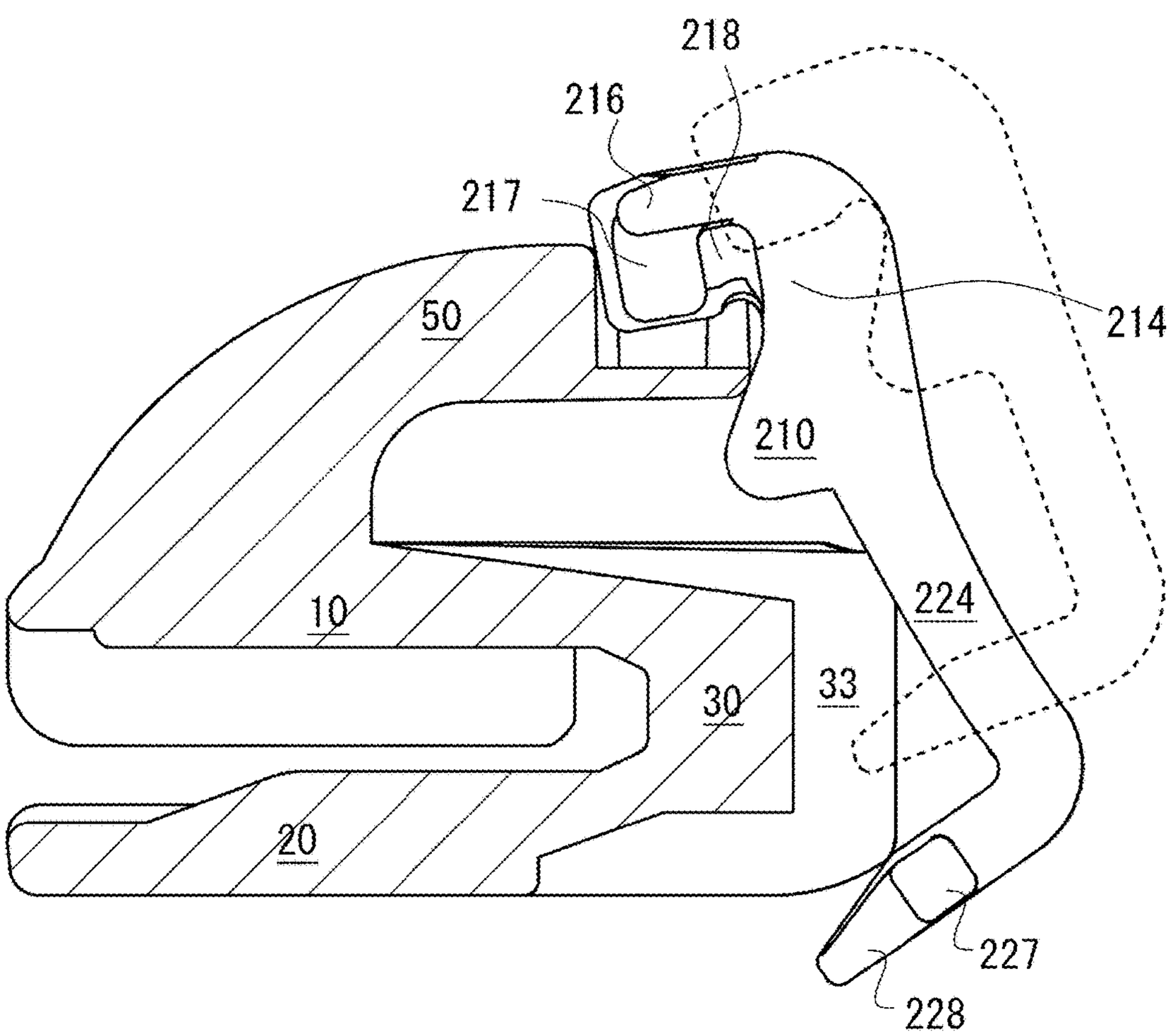


Fig. 8

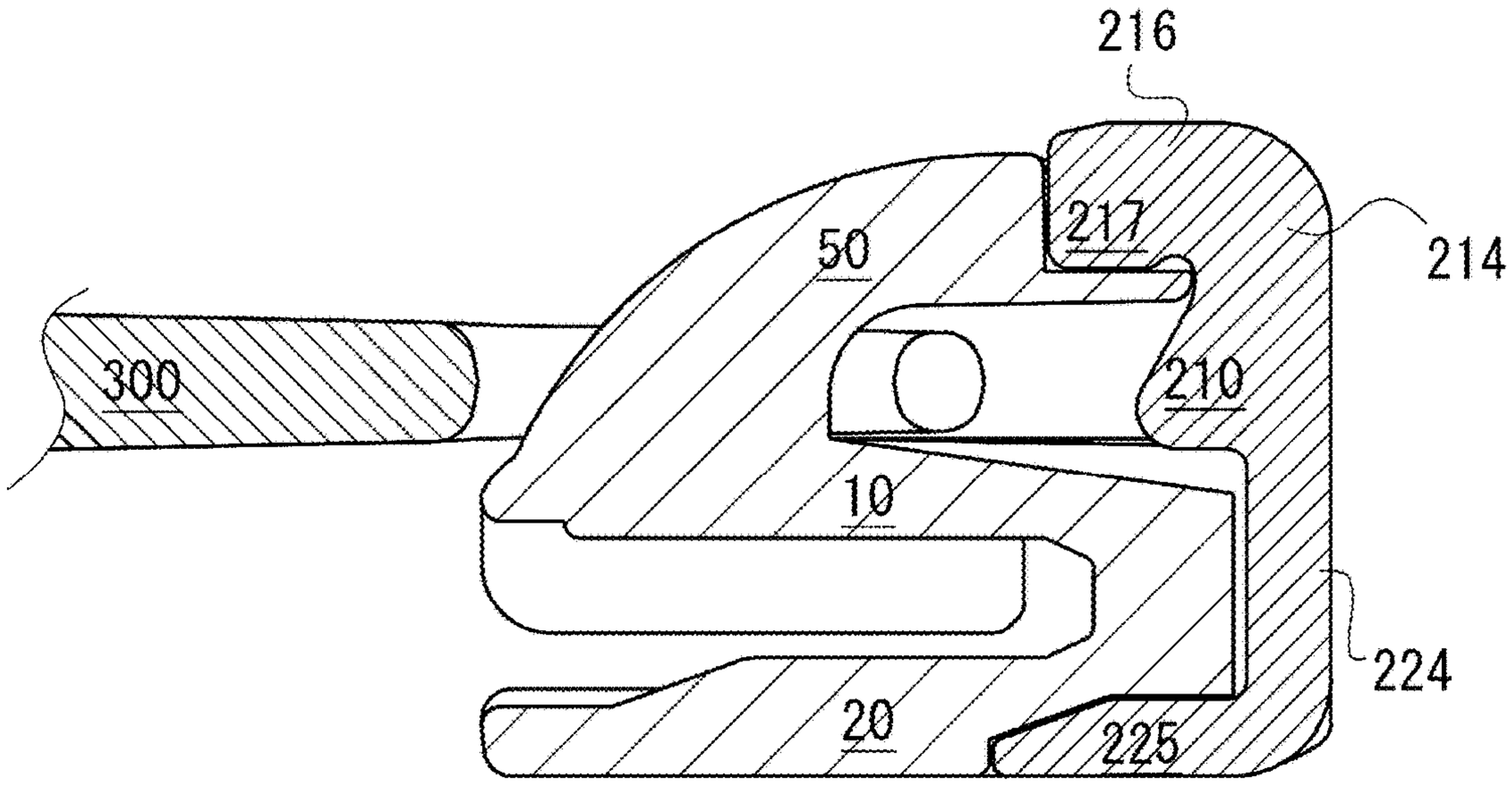


Fig. 9

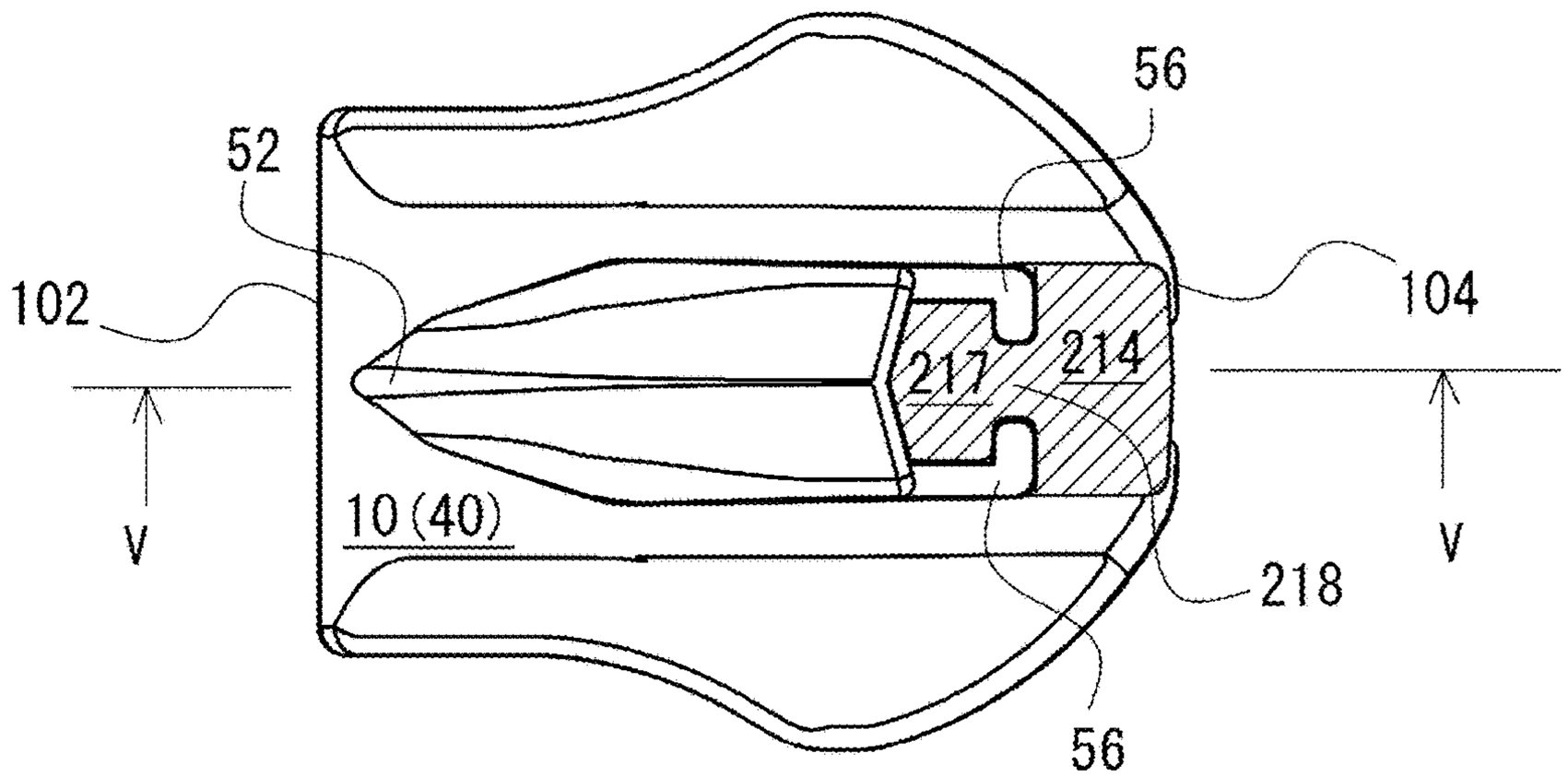
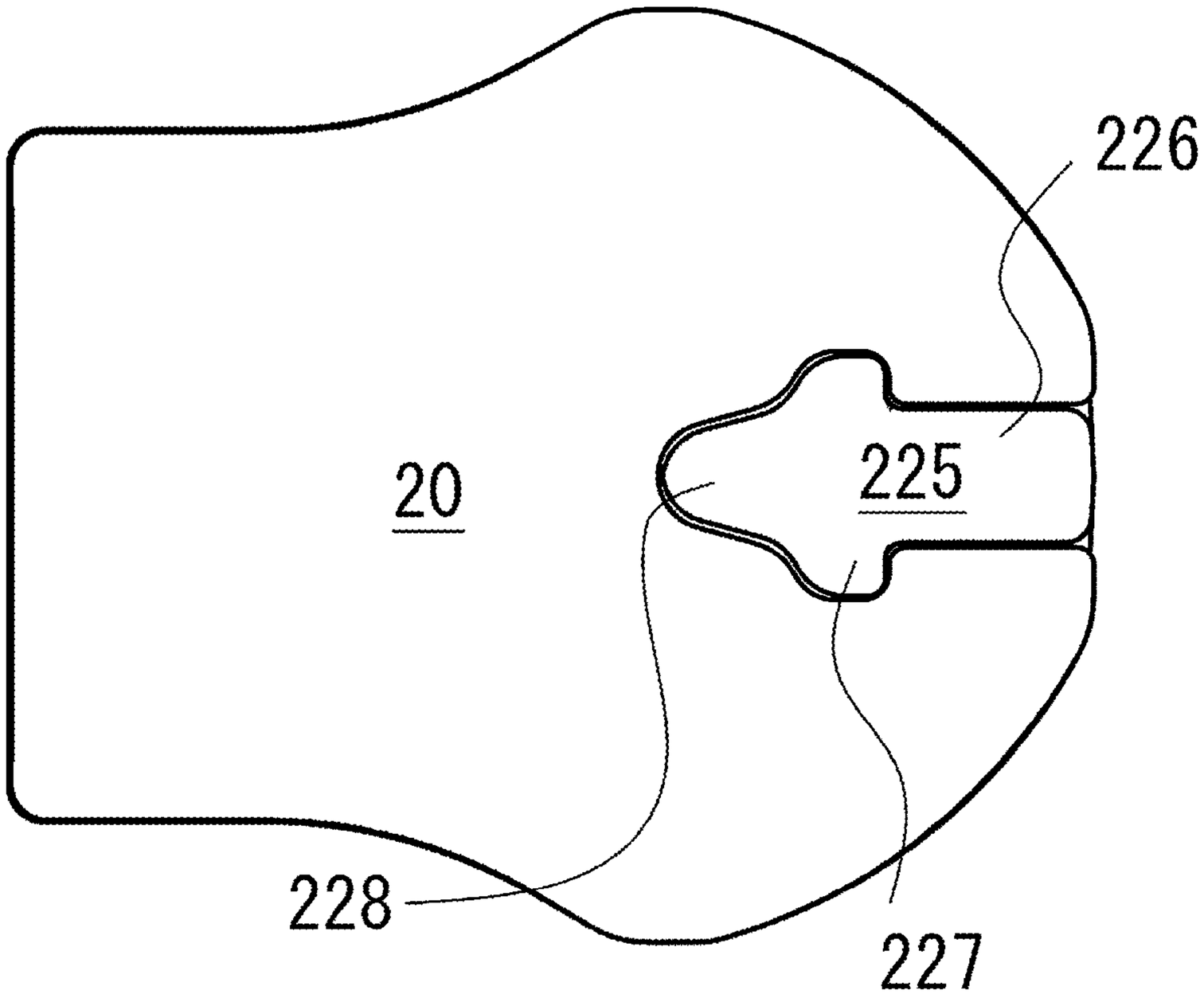


Fig. 10



SLIDER FOR SLIDE FASTENER

This application is a national stage application of PCT/JP2014/074949, which is incorporated herein by reference.

TECHNICAL FIELD

The present disclosure relates to a slider for slide fasteners. In particular, the present disclosure relates to a slider, a slider body, and a closure part.

BACKGROUND ART

There is known a technique of subsequent-attaching (retro-attaching) of a pull tab to a slider body provided with a cantilevered pull tab attachment post. To allow the subsequent attachment of the pull tab, a gap may be present between a free end of the pull tab attachment post and an upper blade of the slider body. This gap may be required at a time of subsequent-attaching of the pull tab, but it may be redundant after the attachment of the pull tab. Therefore, in one method, the attachment of the pull tab may be followed by the pull tab attachment post being deformed so that the gap may be minimized. However, in this case, suppressing an undesired deformation of the slider body due to the application of force to the pull tab attachment post may be preferred, for example, in order to suppress variation of the interspace between the upper blade and the lower blade.

Even if the pull tab attachment post is deformed such as in the above example, the gap may somewhat remain, and foreign objects such as bags will be caught in this gap, so that ease of use for the slide fastener may be impaired.

On the other hand, in other methods, there is known a technique of closing the gap between the free end of the pull tab attachment post and the upper blade using a closure part, thereby closing the gap, from the illustrative viewpoint as stated above or other view point than that stated above. For example, Patent Document 1 discloses a technique for disposing the closure part between the upper blade in the slider body and the free end of the pull tab installing rod as disclosed in FIGS. 1, 4, 7 and the like of this document.

Patent Document 2 discloses a slider having a special structure allowing subsequent attachment of the pull tab.

CITATION LIST

Patent Document 1: WO 2014/073111
Patent Document 2: U.S. Pat. No. 5,551,129

SUMMARY OF INVENTION

Technical Problem

In the case of Patent Document 1, the closure part may be relatively small and may not be easily attached to the slider body, and if simpler attachment is to be maintained, it may be easily detached when local force is applied thereto.

Solution to Problem

A slider according to one aspect of the present invention may be a slider for slide fasteners, comprising:

a slider body (**100**) that includes an upper blade (**10**); a lower blade (**20**); a coupling post (**30**); and a pull tab attachment post (**50**), wherein the coupling post (**30**) couples the upper blade (**10**) and the lower blade (**20**) at a front end portion (**104**) of the slider body (**100**), and the pull tab attachment post (**50**) extends from a base end portion (**52**) thereof coupled to the upper blade (**10**) to a free end portion (**54**) thereof towards the front end portion (**104**) in a cantilevered manner; and

a closure part (**200**) that comprises a closure portion (**210**) for closing a gap (**60**) between the free end portion (**54**) of the pull tab attachment post (**50**) and the upper blade (**10**),

wherein the closure part (**200**) comprises an upper engaging portion (**215**) provided at an upper section of the closure part (**200**) and engaged with the free end portion (**54**) of the pull tab attachment post (**50**); and a leg portion (**220**) provided at a lower section of the closure portion (**210**), and

wherein the leg portion (**220**) comprises a rod portion (**224**) extending from the closure portion (**210**) along the coupling post (**30**); and a lower engaging portion (**225**) coupled to the rod portion (**224**) and engaged with the lower blade (**20**).

In some embodiments, a top surface (**51**) of the free end portion (**54**) of the pull tab attachment post (**50**) may be provided with a recessed upper engaged portion (**55**) with which the upper engaging portion (**215**) is engaged.

In some embodiments, the upper engaging portion (**215**) may have an engaging protrusion (**217**) protruding downward, the upper engaged portion (**55**) has a peripheral wall (**56**) that is opened upward, and the engaging protrusion (**217**) is housed in the peripheral wall (**56**). In addition, it is not necessary that the engaging protrusion is perfectly surrounded by the peripheral wall.

In some embodiments, the coupling post (**30**) has a vertical groove (**33**) that is front-open and vertically extends through the coupling post (**30**), and the rod portion (**224**) is at least partially housed in the vertical groove (**33**).

In some embodiments, the lower engaging portion (**225**) may be a flat plate portion bent relative to the rod portion (**224**), and is housed in the lower engaged portion (**25**) recessed on a bottom surface of the lower blade (**20**).

When a direction in which the coupling post (**30**) extends is defined as an up and down direction, a direction orthogonal to the up and down direction and consistent with a sliding direction of the slider is defined as a front and rear direction, and a direction orthogonal to the up and down direction and the front and rear direction is defined as a left and right direction, each of the upper engaging portion (**215**) and the lower engaging portion (**225**) has at least one protruding portion that protrudes in the left and right direction.

In some embodiments, a surface of the closure portion (**210**) facing the pull tab attachment post (**50**) may be provided with a slope (**213**) rising upward away from the base end portion (**52**) of the pull tab attachment post (**50**).

A closure part according to another aspect of the present invention may be a closure part (**200**) attachable to a slider body (**100**) that may include an upper blade (**10**); a lower blade (**20**); a coupling post (**30**); and a pull tab attachment post (**50**), the coupling post (**30**) coupling the upper blade (**10**) and the lower blade (**20**) at a front end portion (**104**) of the slider body (**100**), and the pull tab attachment post (**50**) extending from a base end portion (**52**) thereof coupled to the upper blade (**10**) to a free end portion (**54**) thereof towards the front end portion (**104**) in a cantilevered manner,

the closure part comprising:

a closure portion (**210**) for closing a gap (**60**) between the free end portion (**54**) of the pull tab attachment post (**50**) and the upper blade (**10**);

an upper engaging portion (**215**) provided at an upper section of the closure part (**200**) and engageable with the free end portion (**54**) of the pull tab attachment post (**50**); and

a leg portion (**220**) provided at a lower section of the closure portion (**210**),

wherein the leg portion (**220**) comprises a rod portion (**224**) extending from the closure portion (**210**) along the coupling post (**30**); and a lower engaging portion (**225**) coupled to the rod portion (**224**) and engageable with the lower blade (**20**).

A slider body according to another aspect of the present invention may be a slider body (**100**) that comprises an upper blade (**10**); a lower blade (**20**); a coupling post (**30**); and a pull tab attachment post (**50**), the coupling post (**30**) coupling the upper blade (**10**) and the lower blade (**20**) at a front end portion (**104**) of the slider body (**100**), and the pull tab attachment post (**50**) extending from a base end portion (**52**) thereof coupled to the upper blade (**10**) to a free end portion (**54**) thereof towards the front end portion (**104**) in a cantilevered manner, and a closure part (**200**) being attachable to the slider body (**100**) to close a gap (**60**) between the free end portion (**54**) of the pull tab attachment post (**50**) and the upper blade (**10**),

wherein the free end portion (**54**) of the pull tab attachment post (**50**) is provided with an upper engaged portion (**55**) with which an upper engaging portion (**215**) of the closure part (**200**) is engageable, and

wherein the lower blade (**20**) is provided with a lower engaged portion (**25**) with which a lower engaging portion (**225**) of the closure part (**200**) is engageable.

In some embodiments, the coupling post (**30**) may have a vertical groove (**33**) that may be front-open and may vertically extend through the coupling post (**30**), the coupling post (**30**) being configured to house a rod portion (**224**) interposed between the upper engaging portion (**215**) and the lower engaging portion (**225**) of the closure part (**200**).

Advantageous Effects of Invention

According to the present invention, it may be possible to facilitate both of simplicity of attachment of the closure part to the slider body and difficulty of detachment of the closure part from the slider body.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a schematic exploded perspective view of a slider for slide fasteners according to a first embodiment of the present invention.

FIG. **2** is a schematic perspective view of a slider for slide fasteners according to a first embodiment of the present invention, showing that a closure part has been attached to the slider body. In this case, a pull tab is not shown.

FIG. **3** is a schematic perspective view of a slider body in a slider for slide fasteners according to a first embodiment of the present invention, showing an upper blade and a pull tab attachment post in the slider body, perspectively viewed from an obliquely upward front.

FIG. **4** is a schematic perspective view of a slider body in a slider for slide fasteners according to a first embodiment of the present invention, showing a bottom surface of a lower blade in the slider body, perspectively viewed from an obliquely lower front.

FIG. **5** is a schematic view showing both of a schematic cross-sectional view of a slider body in a slider for slide fasteners and a side view of a closure part according to a first embodiment of the present invention. In this case, the cross section of the slider body is taken along the plane of V-V in FIG. **9**.

FIG. **6** is a cross-sectional view taken along the VI-VI plane in FIG. **5**.

FIG. **7** is an explanatory view explaining a process of attaching a closure part to a slider body in a slider for slide fasteners according to a first embodiment of the present invention.

FIG. **8** is a schematic sectional view of a slider for slide fasteners according to a first embodiment of the present invention, which shows cross sections of a pull tab, a slider body, and a closure part.

FIG. **9** is a schematic top view of a slider for slide fasteners according to a first embodiment of the present invention, showing that an upper engaging portion of a closure part has been engaged with an upper engaged portion on a free end of a pull tab attachment post, as a partial cross sectional view.

FIG. **10** is a schematic bottom view of a slider for slide fasteners according to a first embodiment of the present invention, showing that a lower engaging portion of a closure part has been engaged with a lower engaged portion of a lower blade.

DESCRIPTION OF EMBODIMENTS

Hereinafter, embodiments of the present invention will be described with reference to the drawings. Respective embodiments are not mutually exclusive, and the skilled person could properly combine them without requiring excess descriptions and could understand the synergic effects by such combinations. Overlapping descriptions among embodiments will be basically omitted. Referenced drawings are mainly for the purpose of illustrating the invention and may be simplified in an appropriate manner.

Terms indicating directions will be defined as follows. An up and down direction corresponds to a direction in which the coupling post extends. A left and right direction corresponds to a direction of horizontal alignment of openings on both sides of the coupling post. A front and back direction is orthogonal to the up and down and left and right directions. The front and back direction also corresponds to a moving direction of the slider for opening and closing slide fasteners, i.e., a sliding direction of the slider. The left and right direction also corresponds to a direction crossing the opposite side edges of the fastener tape. Based on the disclosure of the present application, terms indicating directions can be also defined in different expressions. For example, it is also possible to understand the left and right direction as a width direction, and understanding a size in the width direction of each element or a distance between the elements would be possible, as described below.

First Embodiment

The first embodiment will be described with reference to FIGS. **1** to **10**. FIG. **1** is a schematic exploded perspective view of the slider for the slide fasteners. FIG. **2** is a schematic perspective view of the slider for the slide fasteners, showing that the closure part has been attached to the slider body. For simplification of illustration, the pull tab is not shown. FIG. **3** is a schematic perspective view of the slider body in the slider for the slide fasteners, showing the upper blade and the pull tab attachment post in the slider body, perspectively viewed from an obliquely upward front. FIG. **4** is a schematic perspective view of the slider body in

the slider for the slide fasteners, showing the bottom surface of the lower blade in the slider body, perspectively viewed from an obliquely lower front. FIG. **5** is a schematic view showing both a schematic cross-sectional view of the slider body in the slider for the slide fasteners and a side view of the closure part. In this case, the cross section of the slider body is taken along the plane of V-V in FIG. **9**. FIG. **6** is a cross-sectional view taken along the VI-VI plane in FIG. **5**. FIG. **7** is an explanatory view explaining a process of attaching the closure part to the slider body of the slider for the slide fasteners. FIG. **8** is a schematic sectional view of the slider for the slide fasteners, which shows cross sections of the pull tab, the slider body, and the closure part. FIG. **9** is a schematic top view of the slider for the slide fasteners, showing that the upper engaging portion of the closure part has been engaged with the upper engaged portion on the free end of the pull tab attachment post, as a partial cross sectional view. FIG. **10** is a schematic bottom view of the slider for the slide fasteners, showing that the lower engaging portion of the closure part has been engaged with the lower engaged portion of the lower blade.

As illustrated in FIGS. **1** to **10**, the slider **400** for the slide fasteners may have a slider body **100**, a closure part **200**, and a pull tab **300**. The pull tab **300** may be attached to the slider body **100**, and then the closure part **200** may be attached to the slider body **100**. Since such an assembling procedure is permitted, subsequent attachment of the pull tab **300** may be possible. In other words, it may be possible to widen the degree of freedom of timing of attaching the pull tab **300** to the slider body **100**. There may be also a merit that the slider **400** can be manufactured from the separated slider body **100** and pull tab **300**. In addition, the two components of the slider body **100** and the closure part **200** being not attached to the slider body **100** are considered to be a component unit. The component unit may be also understood as comprising three components including the pull tab **300** additionally to the component unit.

It is noted that the pull tab **300** may be a metal flat plate which has a base end **302** and a grip end **304**, and in which holes **320** and **340** are opened near their respective ends. The pull tab **300** may be attached to the pull tab attachment post **50** by passing the pull tab attachment post **50** through the hole **320** in the pull tab **300**.

The slider **400** may be a slider for a slide fastener, and the slide fastener may be opened and closed by forward and backward movement of the slider **400**. More particularly, left and right fastener elements may be engaged with one another by the forward movement of the slider **400**, so that left and right fastener stringers may be closed. The backward movement of the slider **400** may release the engagement of the left and right fastener elements, so that the left and right fastener stringers may be opened. The slide fastener may be of any type and configuration. Also, the fastener elements may be of any type and configuration, and may include coil elements, resin elements, metal elements and the like.

Intended uses of the slide fastener incorporating the slider **400** may vary widely. For example, intended uses of the slide fasteners may include clothes, luggage, and bags. As described above, the slider **400** according to the present embodiment may allow subsequent attachment of the pull tab. Therefore, even if the pull tab of the slide fastener used for a wide variety of application as stated above may be damaged later, it can be addressed by replacing the damaged pull tub.

For example, it may be envisaged that the slider **400** is incorporated into the slide fastener sewn on a bag and the pull tab of the slider **400** is partially damaged, although it is not intended to be limited to this case. In this case, the damaged pull tab can be also replaced with a new or similar one by detaching the closure part **200** in the slider **400** from the slider body **100** through destruction or removal. This may avoid replacing the whole bag and may be matched with user's needs.

It may be desirable to prepare a new closure part **200** when replacing the pull tab. It may be not easy to detach the closure part **200** from the slider body **100** without deformation or damage. It may be convenient to break the closure part **200** for replacing the pull tab. Even if the closure part **200** was broken for some reason, the broken closure part can be replaced with a new one.

The slider body **100** may be made of a metal or a resin or any other materials. The closure part **200** may be made of a metal or a resin or any other materials. The pull tab **300** may be made of a metal or a resin or any other materials.

In one non-limiting example, the slider body **100** may be made of a metal, the closure part **200** may be made of a resin and the pull tab **300** may be made of a metal. In this example, the attachment of the closure part **200** to the slider body **100** is facilitated. In this example, the closure part **200** may be made of a resin that is rigid but somewhat soft. Thus, the closure part **200** may be made of a material softer than that of the slider body **100**. The closure part **200** may be made of a molded product integrally formed by injection molding using, but not limited to, for example, a thermoplastic resin material and the like, such as polyacetals, polyamides, polypropylenes, and polybutylene terephthalate.

The slider body **100**, the closure part **200** and the pull tab **300** may be manufactured by any manufacturing method. By way of example, the slider body **100** may be manufactured by die casting of a metal material, the closure part **200** may be manufactured by die molding of a resin, and the pull tab **300** may be manufactured by die casting of a metal material, but not limited thereto. The pull tab **300** made of a metal may provide a relatively strong impact to the closure part **200**. This point may be remarkable, for example when compared with a pull made of a cord.

The slider body **100** may include an upper blade **10**, a lower blade **20**, a coupling post **30** coupling the upper blade **10** and the lower blade **20** at a front end portion **104** of the slider body **100**, and a pull tab attachment post **50** provided at the upper blade **10** in the form of cantilever. The slider body **100** may have a rear end portion **102** and a front end portion **104**. The front end portion **104** of the slider body **100** may be provided with a pair of front openings arranged at left and right sides of the coupling post **30**. One rear opening may be provided at the rear end portion **102** of the slider body **100**. The fastener elements may move in a Y-shaped element moving space defined by the upper blade **10**, the lower blade **20** and the coupling post **30**. The left and right fastener elements in the engaged state may enter and leave the rear opening, and the left and right fastener elements in the non-engaged state may enter and leave the pair of front openings arranged at left and right sides.

A pair of left and right flange portions **11** may be provided at the upper blade **10** to restrict any lateral displacement of the fastener elements. A guiding structure for guiding the fastener elements may be provided on each opposing inner surface of the upper blade **10** and the lower blade **20**.

The shape and/or arrangement of the flange portion **11** may be changed depending on various conditions, such as for example, the configuration or use mode of the fastener stringer (also referred to as a fastener chain) on which the fastener elements have been fixed to the fastener tape. For

example, when coil elements are attached to one surface of the fastener tape and the element row is used in a manner that is invisible from the front side, the flange portion **11** may be provided at the lower blade **20** instead of the upper blade **10**. In the case of the fastener chain with resin elements integrally injection molded to a fastener tape or a fastener chain with metal elements crimped and fixed to the fastener tape, the flange portions **11** may be provided at both of the upper blade **10** and the lower blade **20**.

The upper blade **10** and the lower blade **20** may be flat plates opposed to one another and having the same top view shapes. The coupling post **30** couples the front end portion of the upper blade **10** and the front end of the lower blade **20** at a center in the left and right direction. The coupling post **30** may have an upper end portion **31** coupled to the upper blade **10** and a lower end portion **32** coupled to the lower blade **20**, and extends between the upper end portion **31** and the lower end portion **32**. The coupling post **30** may be provided with a vertical groove **33** that may be front-open and may extend there-through in the up and down direction. In the vertical groove **33**, a rod portion **224** of a leg portion **220** of the closure part **200** as described later may be housed and held.

The pull tab attachment post **50** may have a base end portion **52** coupled to the upper blade **10** and a free end portion **54** spaced from the upper blade **10**. The pull tab attachment post **50** may extend from the base end portion **52** at the rear end portion **102** side of the slider body **100** toward the front end portion **104** of the slider body **100**. The free end portion **54** of the pull tab attachment post **50** may be arranged over the front end portion **104** of the slider body **100** defining a gap **60** therebetween.

The top surface of the upper blade **10** may be provided with a lateral groove **15** extending from the base end portion **52** of the pull tab attachment post **50** to the front end portion **104**. The width in the left and right direction of the lateral groove **15** may be less than that of the pull tab attachment post **50**, and the depth of the lateral groove **15** gradually increases as it goes away from the base end portion **52** of the pull tab attachment post **50**. The lateral groove **15** may be in spatial communication with the vertical groove **33** in the coupling post **30**. The bottom surface of the lower blade **20** may be provided with a recessed lower engaged portion **25** to which a lower engaging portion **225** of a leg portion **220** of the closure part **200** as described below may be housed and held. The lower engaged portion **25** may be in spatial communication with the vertical groove **33** in the coupling post **30**.

The spatial communication, as used herein, may be understood to indicate a shape in which the vertical groove **33**, the lateral groove **15** and the lower engaged portion **25** are continuously cut off inward, respectively, from the top surface of the upper blade **10**, the front surface of the coupling post **30** and the bottom surface of the lower blade **20**, as can be seen from FIG. **5**. Thus, the front end of the bottom surface of the lateral groove **15** and the upper end portion of the bottom surface of the vertical groove **33** may be continuously coupled to one another, and the lower end portion of the bottom surface of the vertical groove **33** and the front end portion of the bottom surface of the recessed engaged portion may be continuously coupled.

The closure part **200** may have a closure portion **210**, an upper engaging portion **215** coupled to the closure portion **210**, and a leg portion **220** coupled to the closure portion **210**. The upper engaging portion **215** may be provided above the closure portion **210**. The leg portion **220** may be provided below the closure portion **210** and may be coupled to the bottom surface of the closure portion **210**. The leg portion **220** may include a rod portion **224** extending from the closure portion **210** along the coupling post **30** and a lower engaging portion **225** coupled to the rod portion **224** and engageable with the lower blade **20**. The rod portion **224** may be a part interposed between the upper engaging portion **215** and the lower engaging portion **225**, and may also be a part interposed between the closure portion **210** and the lower engaging portion **225**.

The upper engaging portion **215** may engage with an upper engaged portion **55** provided at a free end portion **54** of the pull tab attachment post **50**. The lower engaged portion **25** may engage with a lower engaged portion **25** provided at the lower blade **20**. Sufficient connection between the slider body **100** and the closure part **200** may be ensured by the closure part **200** sandwiching the slider body **100** from the upper and lower sides.

The closure portion **210** may be present as a large lump/block and may have substantially the same lateral width as that of the pull tab attachment post **50**, and may have substantially the same vertical dimension as that of the gap between the top surface of the upper blade **20** and the bottom surface of the free end portion of the pull tab attachment post **50**. On the other hand, the lateral width of the leg portion **220** may be narrower than that of the closure portion **210**, and may be a rod-like member which is bent in an L-shape so that the tip of the leg portion **220** faces backward. The leg portion **220** may be more flexible than the closure portion **210**. The flexibility of the leg portion **220** may be advantageous in that the attachment of the closure part **200** to the slider body **100** may be facilitated.

The closure portion **210** may have a shape protruding rearward at its lower portion than at its upper portion, and in the closure portion **210**, a slope **213** may be provided at a surface opposed to the base end portion **52** of the pull tab attachment post **50**. The slope **213** rises upward as it extends away from the base end portion **52** of the pull tab attachment post **50**. The slope **213** may be inclined in the forward direction from the top surface of the upper blade **10** to the free end portion **54** of the pull tab attachment post **50**. When the pull tab **300** is pulled forward while maintaining a state where the closure part **200** has been attached to the slider body **100**, a portion surrounding the hole **320** of the pull tab **300** ascends the slope **213** and is brought into contact with the pull tab attachment post **50**. Force from the pull tab **300** may not be received only by the closure part **200**, but the force may be received by both the pull tab attachment post **50** and the closure part **200**, so that the force from the pull tab **300** may be dispersed.

The free end portion **54** of the pull tab attachment post **50** may be provided with an upper engaged portion **55**. The upper engaged portion **55** may be recessed on a top surface **51** of the free end portion **54** of the pull tab attachment post **50**. The upper engaged portion **55** may be depressed downward and opened upward, allowing insertion of the upper engaging portion **215** from above. In the illustrative embodiment shown, the upper engaged portion **55** may be a concave having a depth of half or more of the vertical dimension of the free end portion **54**, and comprises a peripheral wall **56** provided so as to surround an engaging protrusion **217** of the upper engaging portion **215**. The peripheral wall **56** may include right and left walls and a front wall, and may restrict left and right and forward and rearward displacement of the engaging protrusion **217**. A center in the left and right direction of the front wall of the peripheral wall **56** may be cut off. The top surface of the peripheral wall **56** may be

formed such that it is lower than the top surface at the highest position in the pull tab attachment post **50**.

The upper engaging portion **215** may include a base portion **214** coupled to the closure portion **210**, a cover portion **216** extending rearward from the base portion **214**, an engaging protrusion **217** protruding downward from the cover portion **216**, and a linking portion **218** linking the engaging protrusion **217** to the base portion **214**. The upper engaging portion **215** may be provided so as to extend rearward as compared with the closure portion **210**, thereby ensuring the allocation space for the engaging protrusion **217** protruding downward. The cover portion **216** may cover the free end portion **54** of the pull tab attachment post **50** from above, at least covering the upper engaged portion **55**. The cover portion **216** may have a lateral width equal to that of the base portion **214**. Each of the left and right upper edges, front edge, and rear edge of the cover portion **216** may be rounded. The engaging protrusion **217** may have the size slightly smaller than the size defined by the inner wall surface of the peripheral wall **56** of the upper engaged portion **55** and may be housed in the peripheral wall **56**. As shown in FIG. **6**, the tip of the engaging protrusion **217** may be formed in a substantially triangular shape with the center in the left and right direction protruding. As shown in FIG. **5**, a distance D**1** exists between the rear end position of the upper engaging portion **215** and the rear end position of the closure portion **210**.

As shown in FIG. **9**, the engaging protrusion **217** may include a wider portion protruding to the opposite side in the left and right direction to have a wider width. The engaging protrusion **217** may include a pair of protrusions protruding in the left and right direction. In another embodiment, the engaging protrusion **217** may include one protrusion protruding only in one of the left and right directions. The coupling portion **218** may be a narrower width portion having a narrower width in the left and right direction as compared with the engaging protrusion **217** having a wider width in the left and right direction. The wider width portion of the engaging protrusion **217** may be surrounded by the peripheral wall **56** as stated above. The narrower width portion of the coupling portion **218** may be inserted into the removal space of the peripheral wall **56** as stated above. The lateral width of the engaging protrusion **217** may be smaller than that of the cover portion **216**.

The fitting of the engaging protrusion **217** with the peripheral wall **56** may restrict left and right and forward and rearward displacement of the upper engaging portion **215** of the closure part **200** with respect to the free end portion **54** of the pull tab attachment post **50**. The upward movement of the engaging protrusion **217** from the peripheral wall **56** may be prevented by engagement between the lower engaging portion **225** and the lower engaged portion **25**.

The rod portion **224** of the leg portion **220** may extend downward from the closure portion **210** along the coupling post **30**. The upper end of the rod portion **224** may be coupled to the bottom surface of the closure portion **210**. The lower engaging portion **225** may be bent at an angle of about 90° relative to the rod portion **224** and may extend rearward from the lower end of the rod portion **224**. The rear end position of the lower engaging portion **225** may be provided rearward relative to the rear end position of the upper engaging portion **215**, and between them, a distance D**2** is present, as shown in FIG. **5**. The attachment of the closure part **200** to the slider body **100** can be facilitated due to the distance D**2**.

The lower blade **20** may be provided with a lower engaged portion **25**. The lower engaged portion **25** may be recessed on the bottom surface of the lower blade **20** and may be in spatial communication with the vertical groove **33**. The lower engaged portion **25** may be opened at the lower and front sides, allowing insertion of the lower engaging portion **225** from the front or lower side. The lower engaged portion **25** may have a shape conforming to the lower engaging portion **225**, for example, but not limited to, a concave portion having a shape similar to the lower engaging portion **225**.

The lower engaging portion **225** may include a base portion **226** integrally coupled to the lower end of the rod portion **224** and having the same width as that of the rod portion **224** in the left and right direction; a wider intermediate portion **227** protruding in both of the left and right directions relative to the base portion **226** so as to have a wider width; and a narrower end portion **228** having a relatively narrower width in the left and right direction and tapered toward the tip thereof. The wider intermediate portion **227** may include a pair of protrusions that protrude in the left and right direction. In another embodiment, the wider intermediate portion **227** may include one protrusion that protrudes in the left and right direction. The lower engaged portion **25** may be provided with a first groove **25***p* for housing the base portion **226** of the lower engaging portion **225**, a second groove **25***q* for housing the wider intermediate portion **227**, and a third groove **25***r* for housing the narrower end portion **228**. The second groove **25***q* may have a wider width in the left and right direction as compared with the first groove **25***p* and the third groove **25***r*. The thickness in the up and down direction of the lower engaging portion **225** gradually decreases from the wide intermediate portion **227** to the tip of the narrower end portion **228**, and the top surface of the narrower end portion **228** may be provided with a slope slanted downwardly rearward.

The narrower end portion **228** positioned at the tip of the leg portion **220** compared to the wider intermediate portion **227** may facilitate attachment of the closure part **200** to the slider body **100**, as schematically shown in FIG. **7**. More particularly, the narrower end portion **228** of the lower engaging portion **225** may be inserted into the vertical groove **33** in the coupling post **30**, so that the leg portion **220** of the closure part **200** may be bent in the forward direction relative to the closure portion **210**. The lower engaging portion **225** of the leg portion **220** of the closure part **200** may move over the front edge on the bottom surface of the lower blade **20** while the narrower end portion **228** being guided by the vertical groove **33**, and then moves backward along the bottom surface of the lower blade **20** and reaches the lower engaged portion **25** on the bottom surface of the lower blade **20** to be housed.

For specific procedures, for example, the engaging protrusion **217** of the upper engaging portion **215** may be inserted into the peripheral wall **56** of the upper engaged portion **55** from above, and force may be applied such that the leg portion **220** of the closure part **200** may be pressed into the vertical groove **33** on the coupling post **30**. The lower engaging portion **225** then may move over the front edge on the bottom surface of the lower blade **20**, reaches the lower engaged portion **25**, and may be housed and held therein. In this way, the attachment of the closure part **200** to the slider body **100** may be achieved.

In this embodiment, the upper engaging portion **215** and the lower engaging portion **225** themselves do not undergo elastic deformation, thereby allowing a stronger attachment strength. Briefly, the wider width portion or the protrusion

itself included in the engaging protrusion **217** does not undergo elastic deformation, and the wider width portion (the wider intermediate portion **227**) or the protrusion itself included in the lower engaging portion **225** does not undergo elastic deformation. Specifically, the leg portion **220** may be elastically deformed, the distance in the up and down direction between the upper engaging portion **215** and the lower engaging portion **225** may be widened, and then the leg portion **220** elastically returns to the original shape, so that the distance in the up and down direction between the upper engaging portion **215** and the lower engaging portion **225** may recover to the original distance, and the upper engaging portion **215** and the lower engaging portion **225** are engaged with the upper engaged portion **55** and the lower engaged portion **25**, respectively.

The dimension in the up and down direction of the lower engaging portion **225** may be set to be smaller than the dimension in the up and down direction of the upper engaging portion **215**, and the rear end position of the lower engaging portion **225** may be provided rearward relative to the rear end position of the upper engaging portion **215**, and the lower engagement portion **225** may be further provided with a narrower width end portion **228**. Accordingly, the workability of attachment of the closure part **200** to the slider body **100** may be improved, and a stronger attachment strength may be ensured.

In some embodiments, it may be possible to attach the closure part **200** to the slider body **100** not only by a machine but also by a hand. It may be desirable to provide the closure part **200** with flexibility so as to permit deformation of the leg portion **220** with respect to the closure portion **210**. The closure portion **210** serves as a base point or base portion for the attachment of the closure part **200** to the slider body **100**. The component except for the leg portion **220**, for example, the closure portion **210** may not have flexibility.

In this embodiment, the closure part **200** may include a leg portion **220** coupled to the closure portion **210**, and the leg portion **220** may include a rod portion **224** extending from the closure portion **210** along the coupling post **30**; and a lower engaging portion **225** coupled to the rod portion **224** and engageable with the lower blade **20**. Even if local force acts on the closure portion **210** of the closure part **200**, any detachment of the closure part **200** from the slider body **100** may be avoided owing to the lower engagement structure between the lower engaging portion **225** and the lower engaged portion, which may be positioned away from the upper engagement structure between the upper engaging portion **215** and the upper engaged portion **55**. Further, since the closure part **200** may have a relatively large size, its handling becomes simple, thereby allowing easier attachment to the slider body **100**. Again, attachment of the closure part **200** to the slider body **100** may be performed by a machine, human hands or a combination thereof.

In this embodiment, the upper engaging portion **215** may include an engaging protrusion **217** protruding downward, and the upper engaged portion **55** may include a peripheral wall **56** that opens upward. Insertion of the engaging protrusion **217** into the peripheral wall **56** can be relatively easily performed.

In this embodiment, the closure part **200** may be made of a material softer than that of the slider body **100**. This may further facilitate the attachment of the closure part **200** to the slider body **100**. Furthermore, in this case, the closure part **200** may be easily destroyed by a tool such as a cutter and a scissors, so that it is easy to replace the pull tab.

In this embodiment, the leg portion **220** of the closure part **200** may have flexibility, thereby ensuring simple attachment of the closure part **200** to the slider body **100**.

In this embodiment, the coupling post **30** in the slider body **100** may be provided with a vertical groove **33** in which the rod portion **224** of the leg portion **220** may be housed and held. Accordingly, the rod portion **224** do not have any effect on operation of the slider **400**. Further, it may be avoided that the rod portion **224** projects forward.

In this embodiment, when the lower engaging portion **225** of the closure part **200** may be housed in the lower engaged portion **25** of the lower blade **20**, the bottom surface of the lower engaging portion **225** becomes flush with the bottom surface of the lower blade **20**. Therefore, this prevents the lower engaging portion **25** from being perceived by a human skin as a protrusion.

In view of the above teachings, the skilled person could add various modifications to the respective embodiments. The reference numbers introduced in Claims are just for a reference, and should not be used for the purpose of narrowly construing claims.

The upper engaging portion **215** does not necessarily need to be engaged with the upper engaged portion **55** recessed on the top surface **51** of the free end portion **54** in the pull tab attachment post **50**, and may be configured to engage with the upper engaged portion recessed on the bottom surface of the end portion **54** of the pull tab attachment post **50**, as in Patent Document 1.

The longitudinal length of the pull tab attachment post **50** may be shortened, and to compensate for this, the upper engaging portion **215** may be further projected rearward. A plurality of engaging protrusions **217** may be provided at the upper engaging portion **215**. In this case, the upper engaged portion **55** may be provided with a housing/recessed portion defined so as to match each engaging protrusion **217**.

The lower engaging portion **225** may be further extended rearward. In this case, the lower engaged portion **25** may be also further extended rearward. The rod portion **224** of the leg portion **220** may protrude from the vertical groove **33** of the coupling post **30** to have any sectional shape in a plane orthogonal to the up and down direction. Individual specific shapes of the closure portion **210**, the upper engaging portion **215** and the leg portion **220** may be changed as needed.

For the attachment of the closure part **200** to the slider body **100**, the lower engaging portion **225** may be engaged with the lower engaged portion **25**, and the upper engaging portion **215** may be then engaged with the upper engaged portion **55**.

DESCRIPTION OF REFERENCE NUMERALS

400 slider
100 slider body
200 closure part
10 upper blade
20 lower blade
30 coupling post
50 pull tab attachment post
52 base end portion
54 free end portion
102 rear end portion
104 front end portion
210 closure portion
215 upper engaging portion

220 leg portion
224 rod portion
225 lower engaging portion

The invention claimed is:

1. A slider for slide fasteners, comprising:

a slider body that includes an upper blade; a lower blade; a coupling post; and a pull tab attachment post wherein the coupling post couples the upper blade and the lower blade at a front end portion of the slider body, and the pull tab attachment post extends from a base end portion thereof coupled to the upper blade to a free end portion thereof towards the front end portion as a cantilever; and

a closure part that comprises a closure portion for closing a gap between the free end portion of the pull tab attachment post and the upper blade,

wherein the closure part comprises an upper engaging portion provided at an upper section of the closure part and engaged with the free end portion of the pull tab attachment post; and a leg portion provided at a lower section of the closure portion, and

wherein the leg portion comprises a rod portion extending from the closure portion along the coupling post; and a lower engaging portion coupled to the rod portion and engaged with the lower blade.

2. The slider according to claim **1**, wherein a top surface of the free end portion of the pull tab attachment post is provided with a recessed upper engaged portion with which the upper engaging portion is engaged.

3. The slider according to claim **2**, wherein the upper engaging portion has an engaging protrusion protruding downward, the upper engaged portion has a peripheral wall that is opened upward, and the engaging protrusion is housed in the peripheral wall.

4. The slider according to claim **1**, wherein the coupling post has a vertical groove that is front-open and vertically extends through the coupling post, and the rod portion is at least partially housed in the vertical groove.

5. The slider according to claim **1**, wherein the lower engaging portion is a flat plate portion bent relative to the rod portion, and is housed in a lower engaged portion recessed on a bottom surface of the lower blade.

6. The slider for a slide fastener according to claim **1**, wherein when a direction in which the coupling post extends is defined as an up and down direction, a direction orthogonal to the up and down direction and consistent with a sliding direction of the slider is defined as a front and rear direction, and a direction orthogonal to the up and down direction and the front and rear direction is defined as a left and right direction, each of the upper engaging portion and the lower engaging portion has at least one protruding portion that protrudes in the left and right direction.

7. The slider according to claim **1**, wherein a surface of the closure portion facing the pull tab attachment post is provided with a slope rising upward away from the base end portion of the pull tab attachment post.

8. A closure part attachable to a slider body that includes an upper blade; a lower blade; a coupling post; and a pull tab attachment post, the coupling post coupling the upper blade and the lower blade at a front end portion of the slider body, and the pull tab attachment post extending from a base end portion thereof coupled to the upper blade to a free end portion thereof towards the front end portion as a cantilever, the closure part comprising:

a closure portion for closing a gap between the free end portion of the pull tab attachment post and the upper blade;

an upper engaging portion provided at an upper section of the closure part and engageable with the free end portion of the pull tab attachment post; and

a leg portion provided at a lower section of the closure portion,

wherein the leg portion comprises:

a rod portion extending from the closure portion along the coupling post; and

a lower engaging portion coupled to the rod portion and engageable with the lower blade.

9. A slider body that comprises an upper blade; a lower blade; a coupling post; and a pull tab attachment post, the coupling post coupling the upper blade and the lower blade at a front end portion of the slider body, and the pull tab attachment post extending from a base end portion thereof coupled to the upper blade to a free end portion thereof towards the front end portion as a cantilever, and a closure part being attachable to the slider body to close a gap between the free end portion of the pull tab attachment post and the upper blade,

wherein the free end portion of the pull tab attachment post is provided with an upper engaged portion with which an upper engaging portion of the closure part is engageable, and

wherein the lower blade is provided with a lower engaged portion with which a lower engaging portion of the closure part is engageable.

10. The slider body according to claim **9**, wherein the coupling post has a vertical groove that is front-open and vertically extends through the coupling post, the coupling post being configured to house a rod portion interposed between the upper engaging portion and the lower engaging portion of the closure part.

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